

CLAIMS

1. A method for the production of a library of heparan sulfate derivatives said method comprising a combination of chemical modification steps in which
5 at least one, two or three modification steps of said combination are selected from the group A to O wherein:

A. partial de N-sulfation in glucosamine
B. complete de N-sulfation in glucosamine
10 C. partial de N-acetylation in glucosamine
D. complete de N-acetylation in glucosamine
E. re N-sulfation in glucosamine of all available amino groups
F. re N-acetylation in glucosamine of all available amino groups
G. partial re N-sulfation in glucosamine
15 H. partial re N-acetylation in glucosamine
I. complete de-O-sulfation at position 6 of glucosamine
J. partial de-O-sulfation at position 6 of glucosamine
K. partial de-O-sulfation at both position 6 of glucosamine and 2 of
iduronate accompanied by complete de N-sulfation in glucosamine.
20 L. complete de-O-sulfation at both position 6 of glucosamine, 2 of
iduronate and de-N-sulfation in glucosamine
M. partial de-O-sulfation at position 6 and complete de-N-sulfation of
glucosamine
N. complete de-O-sulfation at position 2 of iduronate
25 O. complete de-O-sulfation at position 6 and de N-sulfation of glucosamine
and partial de-O-sulfation of iduronate

2. The method of claim 1 wherein all steps of said combination are chosen from the group A to O.

3. The method according to claim 1 or claim 2 wherein said library is
5 structurally more diverse than the heparan sulfate starting material from which it is derived.

4. The method according to any one of claims 1 to 3 wherein at least one modification step in said combination is an partial modification.

10 5. The method according to any one of claims 1 to 4 wherein at least one complete or partial modification is carried out at the amino function (N-) of glucosamine .

15 6. The method according to any one of claims 1 to 5 wherein at least two modification steps in said combination are partial modifications.

7. The method according to any one of claims 1 to 6 wherein at least three modification steps in said combination are partial modifications.

20 8. The method according to any one of claims 1 to 7 wherein a first step of modification is chosen from A, B, C or D, such that wherein step A is chosen, optional subsequent steps are one or more of E, F, G, H, I, J, K, L, M, N, O, in any combination, or wherein step B is chosen, optional simultaneous or
25 subsequent steps are one or more of E, F, G, H, I, J, K, L, M, N, O, in any combination;

9. The method according to claim 8 wherein a second step of modification chosen from E, F, G, or H is performed upon the modified products of said first step.

5 10. The method according to claim 9 wherein a third step of modification chosen from A, B, C, D, E, F, G, H, I, J, K, L, M, N, O is performed upon the modified products of said second step.

10 11. The method according to claim 10 wherein a fourth step of modification chosen from A, B, C, D, E, F, G, H, I, J, K, L, M, N, O is performed upon the modified products of said third step.

12. The method according to claim 11 wherein the combination of modifications is chosen from a first step and second to fourth optional steps such that:

First Step	Optional Second Step	Optional Third Step	Optional Fourth Step
B(+/-any of I to O)	G	F/H	
B(+/-any of I to O)	H	E/G	
B(+/-any of I to O)	E		
B(+/-any of I to O)	F		
A	F	+/-any of I to O	E/G
A	H	+/-any of I to O	E/G

13. The method according to claim 12 wherein said first step modification is B (+/- any of I to O), said second step modification is H, and said third step modification is E or G.

20 14. The method according to claim 12 wherein said first step modification is B (+/- any of I to O), said second step modification is G, and said third step modification is F or H.

15. The method according to any one of claims 1 to 14, the method comprising the additional steps (singly or jointly) of

5 (a)(i) determining at least one functional property of one or more compounds;

(b)(i) making a further library via the method according to any one of claims 1 to 14 wherein said modifications are chosen according to the functional determination or determinations made in step (a)(i);

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and/or;

(a)(ii) determining at least one structural feature of one or more compounds;

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(b)(ii) making a further library via the method according to any one of claims 1 to 14, wherein said modifications are chosen according to the structural determination or determinations made in step (a)(ii);

and/or,

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(b)(iii) making a further library via the method according to any one of claims 1 to 14, wherein said modifications are chosen according to both said functional determination(s) made in step (a)(i) and said structural determination(s) made in step (a)(ii).

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16. A method of producing a supplementary library of modified heparin derivatives comprising steps (singly or jointly)

(i) screening a library of heparan sulfate derivatives for compounds which have particular structural and/or functional characteristics,

(ii) determining at least one structural feature of the compounds having said particular structural and/or functional characteristics,

or

(iii) determining at least one functional property of the compounds having
5 said particular structural and/or functional characteristics,

or

(iv) determining at least one functional and one structural property of the compounds having said particular structural and/or functional characteristics;
steps (ii), (iii) and (iv) being followed by step

10 (v) making said further library via the methods of any one of claims 1 to 14 wherein the modifications and number of modification steps are chosen according to the determinations of steps (ii), (iii) or (iv).

15 17. The method according to claim 16 wherein the library of step (i) is made by a method according to any one of claims 1 to 14.

18. The method according to claim 16 or 17 wherein at step (v) a single combination of modification steps is chosen in order to reproduce only the compound(s) having said desired characteristics.

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19. The method according to claim 16 or 17 wherein the structural determination(s) made at step (ii) or (iv) is/are provided by the discreet known location, in a spatially separated library, of the compounds having said particular structural and/or functional characteristics.

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20. A library containing at least two heparan sulfate derivatives produced by the method of any one of claims 1 to 19.

21. The library according to claim 20 in which the compounds contained therein are spatially separated from each other.

22. The library, or components of the library produced by any one of the 5 claims 1 to 19, in which said components are;

- (a) spatially separated,
- (b) spatially separated into defined locations,
- (c) spatially separated into defined locations and attached to a surface,
- (e) spatially separated such that an interaction between one or more compounds 10 within said library and the molecule, complex of molecules, cell or organism of interest can be detected,
- (f) spatially separated into defined locations such that an interaction between one or more compounds within said library and the molecule, complex of molecules, cell or organism of interest can be detected,
- 15 (g) spatially separated into defined locations and attached to a surface such that an interaction between one or more compounds within said library and the molecule, complex of molecules, cell or organism of interest can be detected.